AD-A102 724 NEW JERSEY DEPT OF ENVIRONMENTAL PROTECTION TRENTON --ETC F/G 13/13
NATIONAL DAM SAFETY PROGRAM. N.J. NO NAME NUMBER 56 DAM (NJ0080--ETC(U)
MAY 81 R J MCDERMOTT, J E GRIBBIN DACW61-79-C-0011
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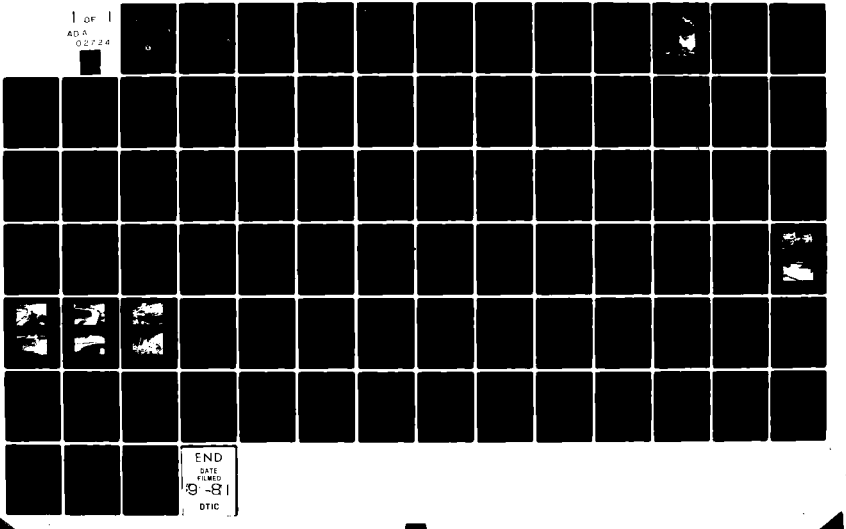

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WHIPPANY RIVER BASIN
MALAPARDIS BROOK, MORRIS COUNTY
NEW JERSEY

LEVEL II

N.J. NO NAME NO. 56
DAM
NJ00804

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PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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DEPARTMENT OF THE ARMY
Philadelphia District
Corps of Engineers
Philadelphia, Pennsylvania

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MAY 1981

REPT. NO: DAEN/NAP-53842/NJ00804-81/05

National Dam Safety Program. No Name Number 56 Dam (NJ00804), Whippany River Basin, Malapardis Brook, Morris County, New Jersey. Phase I Inspection Report.

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Copies are obtainable from National Technical Information Service, Springfield, Virginia 22151.

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Dams	Malapardis Brook, NJ National Dam Safety Program	
Embankments	Spillways	Whippany River Basin, NJ
Visual Inspection	Erosion	Morris County, N.J.
Structural Analysis	Embankment	N.J. No Name Dam No. 56, N.J.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.

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DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT CORPS OF ENGINEERS
CUSTOM HOUSE—2 D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

(1)

REPLY REFER TO
NAPEN-N

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, New Jersey 08621

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for N.J. No Name Dam No. 56 in Morris County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in the front of the report.

Based on visual inspection, available records, calculations and past operational performance, N.J. No Name No. 56 Dam, initially listed as a 'high hazard' potential structure, but reduced to a 'significant hazard' potential structure as a result of this inspection, is judged to be in fair overall condition. The dam's spillway is considered inadequate because a flow equivalent to 7 percent of the Spillway Design Flood (SDF) would cause the dam to be overtopped. To ensure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures and studies within six months from the date of approval of this report. Within three months of the consultant's findings remedial measures to ensure spillway adequacy should be initiated. etc.

b. Within six months from the date of approval of this report the following remedial actions should be initiated:

(1) Erosion of the channel immediately downstream of the dam should be repaired, and the channel properly stabilized.

(2) All trees and adverse vegetation on the embankment should be removed, and the embankment suitably graded and protected against erosion.

(3) The concrete wall along the upstream side of the embankment should be repaired, etc.

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c. The owner should develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam, within one year from the date of approval of this report.

d. An emergency action plan and warning system should be developed which outlines actions to be taken by the owner to minimize the downstream effects of an emergency at the dam within six months from the date of approval of this report.

A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congresswoman Fenwick of the Fifth District. Under the provision of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, five days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

An important aspect of the Dam Inspection Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely,

ROGER L. BALDWIN
Lieutenant Colonel, Corps of Engineers
Commander and District Engineer

1 Incl
As stated

Copies furnished:
Mr. Dirk C. Hofman, P.E., Deputy Director
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

Mr. John O'Dowd, Acting Chief
Bureau of Flood Plain Regulation
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

N.J. NO NAME NO. 56 DAM (NJ00804)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 17 December 1980 by Storch Engineers, under contract to the State of New Jersey. The State, under agreement with the U.S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

N.J. No Name No. 56 Dam, initially listed as a high hazard potential structure, but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in fair overall condition. The dam's spillway is considered inadequate because a flow equivalent to 7 percent of the Spillway Design Flood (SDF) would cause the dam to be overtopped. To ensure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures and studies within six months from the date of approval of this report. Within three months of the consultant's findings remedial measures to ensure spillway adequacy should be initiated.

b. Within six months from the date of approval of this report the following remedial actions should be initiated:

(1) Erosion of the channel immediately downstream of the dam should be repaired, and the channel properly stabilized.

(2) All trees and adverse vegetation on the embankment should be removed, and the embankment suitably graded and protected against erosion.

(3) The concrete wall along the upstream side of the embankment should be repaired.

c. The owner should develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam, within one year from the date of approval of this report.

d. An emergency action plan and warning system should be developed which outlines actions to be taken by the owner to minimize the downstream effects of an emergency at the dam within six months from the date of approval of this report.

APPROVED: _____

ROGER L. BALDWIN
Lieutenant Colonel, Corps of Engineers
Commander and District Engineer

DATE: 29 July 81

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

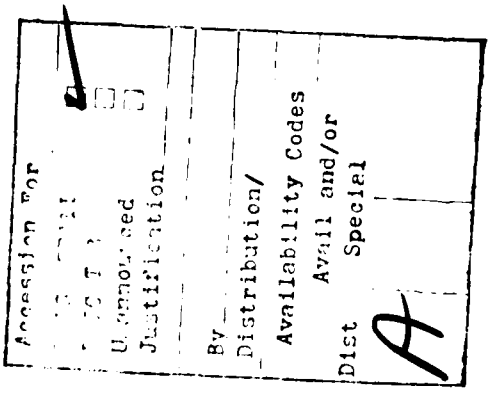
Name of Dam:	N.J. No Name No. 56, Dam, NJ00804
State Located:	New Jersey
County Located:	Morris
Drainage Basin:	Whippany River
Stream:	Malapardis Brook
Date of Inspection:	December 17, 1980

Assessment of General Conditions of Dam

Based on visual inspection, past operational performance and Phase I engineering analyses, the dam is assessed as being in fair overall condition.

Based on investigations of the downstream flood plain made in connection with this report, it is recommended that the hazard potential classification be downgraded from high to significant hazard.

Hydraulic and hydrologic analyses indicate that the spillway is inadequate. Discharge from the spillway is not sufficient to pass the designated spillway design flood (SDF) without an overtopping of the dam. (The SDF for N.J. No Name No. 56 Dam is equivalent to the 100-year storm.) The spillway is capable of passing approximately 6 percent of the SDF. Therefore, the owner should engage a professional engineer experienced in the design and construction of dams in the near future to perform more accurate hydraulic and hydrologic analyses. Based on the findings of the analyses, the need for and type of remedial measures should be determined and then implemented.



The owner should, in the near future, develop an emergency action plan together with an effective warning system outlining actions to be taken by the operator to minimize the downstream effects of an emergency at the dam.

In addition, it is recommended that the following remedial measures be undertaken by the owner in the near future.

1) Erosion of the channel immediately downstream of the dam should be repaired, and the channel properly stabilized.

2) All trees and adverse vegetation on the embankment should be removed, and the embankment suitably graded and protected against erosion.

3) The concrete wall along the upstream side of embankment should be repaired.

In the future, the owner of the dam should develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam.

Richard J. McDermott, P.E.

John E. Gribbin, P.E.

OVERVIEW - NJ NO NAME No. 56 DAM

20 JANUARY 1981

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. It is important to note that the condition of dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that the unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydraulic and hydrologic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydraulic and hydrologic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

N.J. NO NAME NO. 56 DAM, I.D. NJ00804

SECTION 1: PROJECT INFORMATION

1.1 General

a. Authority

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The Division of Water Resources of the New Jersey Department of Environmental Protection (NJDEP) in cooperation with the Philadelphia District of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the State of New Jersey. Storch Engineers has been retained by the NJDEP to inspect and report on a selected group of these dams. The NJDEP is under agreement with the Philadelphia District of the Corps of Engineers.

b. Purpose of Inspection

The visual inspection of N.J. No Name No. 56 Dam was made on December 17, 1980. The purpose of the inspection was to make a general assessment of the structural integrity and operational adequacy of the dam structure and its appurtenances.

1.2 Description of Project

a. Description

N.J. No Name No. 56 Dam is an earthfill dam with a boulder lined chute spillway and an adjacent outlet conduit connected to a downstream mill building. The upstream face of the dam is formed by a concrete wall to the right of the spillway and a stone rubble wall to the left of the spillway.

The intake structure for the outlet conduit consists of a concrete inlet located at the left end of the dam. The structure is fitted with steel fish screens and contains no observable gate operating mechanism. The conduit is a 24-inch cast iron pipe.

The elevation of the spillway crest is 275.0 National Geodetic Vertical Datum (N.G.V.D.) while that of the crest of dam is 277.0. The downstream channel bed elevation is 269.8. The overall length of the dam is 123 feet and its height is 7.2 feet. the top width of the embankment is 20 feet and the slope of the downstream face is 4 horizontal to 1 vertical.

b. Location

N.J. No Name No. 56 Dam is located in the Township of Hanover, Morris County, New Jersey. It impounds an unnamed lake located west of North Jefferson Road. Principal access to the dam is by an unpaved road which is entered from North Jefferson Road. Discharge from the spillway of the dam flows into the Malapardis Brook, tributary to the Whippany River.

c. Size and Hazard Classification

The dam is classified in accordance with criteria presented in "Recommended Guidelines for Safety Inspection of Dams" published by the U.S. Army Corps of Engineers. Size categories consist of Small, Intermediate and Large while hazard categories are designated as Low, Significant and High.

Size Classification: N.J. No Name No. 56 Dam is classified as "Small" size since its maximum storage volume is 128 acre-feet (which is less than 1000 acre-feet) and its height is 7.2 feet (which is less than 40 feet).

Hazard Classification: Visual inspection of the downstream flood plain of the dam together with breach analysis indicate that failure of the dam due to overtopping during a storm equivalent to the spillway design flood (SDF) could cause property damage to the mill building and grounds located 350 feet downstream from the dam. Extensive structural damage to the road bridge (North Jefferson Road) located 350 feet from the dam is not anticipated as a result of dam failure. Loss of more than a few lives is not anticipated. Accordingly, N.J. No Name No. 56 Dam is classified as "Significant" hazard.

d. Ownership

N.J. No Name No. 56 Dam is owned and operated by the Whippany Paper Board Company, 10 North Jefferson Road, Whippany, New Jersey 07981.

e. Purpose of Dam

The purpose of the dam was the impoundment of a lake used for flood control and for water supply for the downstream mill owned by the Whippany Paper Board Company. Reportedly, the impoundment is not presently being used for any purpose.

f. Design and Construction History

N.J. No Name No. 56 Dam reportedly was constructed by Whippany Paper Board Company around 1960.

g. Normal Operational Procedures

The dam and appurtenances are operated and maintained by the Whippany Paper Board Company. Repairs are made on an "as needed" basis. However, the dam is not presently in use and, reportedly, the Whippany Paper Board Company does not intend to make use of the dam in the future.

1.3 Pertinent Data

a. Drainage Area	4.55 square miles
b. Discharge at Damsite	
Maximum flood at damsite	Unknown
Outlet works at pool elevation	N.A.
Spillway capacity at top of dam	189 c.f.s.
c. Elevation (N.G.V.D.)	
Top of Dam	277.0
Maximum pool-design surcharge	279.1
Spillway crest	275.0
Stream bed at toe of dam	269.8
Maximum tailwater	275 (Estimated)
d. Reservoir	
Length of maximum pool	1100 feet (Estimated)
Length of recreation pool	900 feet (Scaled)

e. Storage (Acre-feet)

Recreation pool	15
Design surcharge	654
Top of dam	128

f. Reservoir Surface (acres)

Top of dam	234	(Estimated)
Maximum pool - design surcharge	459	(Estimated)
Recreation pool	8.7	

g. Dam

Type	Earthfill
Length	123 feet
Height	7.2 feet
Sideslopes - Upstream	Left Section: 1 horiz. to 1 vert Right Section: Vertical
- Downstream	4 horiz. to 1 vert.
Zoning	Unknown
Impervious core	Unknown
Cutoff	Unknown
Grout curtain	Unknown

h. Diversion and Regulating Tunnel — N.A.

i. Spillway

Type	Boulder lined chute, Trapezoidal Section
Length of weir	16 feet
Crest elevation	275.0
Approach channel	N.A.
Discharge channel	Natural Streambed

j. Regulating Outlet

24-inch C.I.P. running to downstream mill
(Operating mechanism unknown)

SECTION 2: ENGINEERING DATA

2.1 Design

No plans or calculations pertaining to the original design of the dam could be obtained.

2.2 Construction

No data or reports pertaining to the construction of the dam are available.

2.3 Operation

No data or reports pertaining to the operations of the dam are available. Reportedly, drawings relating to a pending lake lowering permit are presently available in the files of the Hanover Township Engineering Department.

2.4 Evaluation

a. Availability

Available engineering data is limited to that which is on file at the Hanover Township Engineering Department. The file contains drawings relating to the lake lowering permit presently pending.

b. Adequacy

Available engineering data pertaining to N.J. No Name No. 56 Dam is not adequate to be of significant assistance to the performance of a Phase I evaluation. A list of absent information is included in paragraph 7.1.b.

c. Validity

The validity of engineering data cannot be assessed due to the absence of data.

SECTION 3: VISUAL INSPECTION

3.1 Findings

a. General

The inspection of N.J. No Name No. 56 Dam was performed on December 17, 1980 by staff members of Storch Engineers. A copy of the visual inspection check list is contained in Appendix 1. The following procedures were employed for the inspection:

1) The embankment of the dam, appurtenant structures and adjacent areas were examined.
2) The embankment and accessible appurtenant structures were measured and key elevations determined by surveyor's level.
3) The embankment, appurtenant structures and adjacent areas were photographed.

b. Dam

The concrete wall forming the upstream side of the dam appeared to be in fair condition. The crest and downstream side of the dam appeared to be deteriorated condition. The crest was covered with weeds and the downstream side was irregularly shaped and overgrown with weeds and small trees. No evidence of seepage or animal holes on the downstream side of the dam was observed, although the dam was obscured by approximately 1-inch of snow.

The spillway discharge channel leads directly away from the dam for approximately 20 feet and then bends sharply to the right, or south, for another 30 feet and then sharply to the left,

or east, to lead away from the dam as the downstream channel. At the first bend considerable erosion was observed along the left bank of the channel or chute, with many roots of trees exposed.

c. Appurtenant Structures

The outlet structure located at the left end of the dam appears to be an outlet for a 24-inch cast iron pipe used to supply water to a mill downstream from the dam.

The concrete forming the outlet structure chamber and the headwall appeared to be in satisfactory condition. It appeared that there were two fish screens or trash racks on both the upstream and downstream sides of the headwall. Their conditions appeared to be satisfactory. Approximately 1 foot downstream from the headwall there was a slot with another fish screen protruding and its condition appeared to be satisfactory as well.

d. Reservoir Area

The impoundment of the dam is 900 deet long with a width varying from 300 to 400 feet. The land surrounding the reservoir appeared to be undeveloped grassland. The reservoir bank is approximately 2 feet high and the land beyond the bank has a terrain with flat slopes. To the left of the reservoir at its upstream end there is an adjacent garage with approximately 10 bays and a yard for trucks and equipment. The upstream end of the impoundment is connected by culverts under Route 287 to an additional impoundment including a large area known as Lee Meadows.

e. Downstream Channel

The spillway discharges into the Malapardis Brook, a tributary of the Whippany River. Between the dam and the North Jefferson Road Bridge (approximately 350 feet downstream) the downstream channel is a rock-lined stream with high banks having slopes of approximately 50 percent and tree and brush growth on the banks. Downstream from the bridge the channel bed remains the same, rocky and slightly meandering; however, the right bank is formed by the Brick Mill Building and the left bank is rocky and tree and brush covered. The 24-inch cast iron pipe bringing water from the dam impoundment to the mill crosses the channel at a skewed angle approximately 100 feet downstream from the bridge.

SECTION 4: OPERATIONAL PROCEDURES

4.1 Procedures

The level of water in the impoundment of the subject dam is regulated by discharge over the boulder lined chute spillway. The outlet works of the dam is used to draw off water for the purpose of supplying the mill downstream via the 24 inch C.I.P. but reportedly is no longer in use.

The Whippany Paper Board Company has applied to Hanover Township for permission to lower the normal lake level by approximately two feet for the purpose of lowering the water table at the request of the Prudential, which is located in the vicinity of the subject dam.

4.2 Maintenance of the Dam

Reportedly, maintenance is performed on an "as needed" basis.

4.3 Maintenance of Operating Facilities

Reportedly, the outlet works is maintained on an "as needed" basis.

4.4 Description of Warning System

Reportedly, no warning system is currently in use for the dam.

4.5 Evaluation of Operational Adequacy

The operation of the dam has not been successful to the extent that the dam reportedly has been overtopped in the past.

Maintenance is inadequate and maintenance documentation is poor. Areas of maintenance that have not been adequately performed are:

1) Erosion of the spillway discharge channel immediately downstream of the dam not repaired.
2) Trees and bushes on the embankment not removed.
3) Embankment not suitably protected against erosion.
4) Concrete wall along upstream side of embankment not repaired.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design Data

The quantity of storm water runoff that the spillway should be able to handle is based on the size and hazard classification of the dam. This runoff quantity, called the spillway design flood (SDF) is described in terms of return frequency or probable maximum flood (PMF) depending on the extent of the dam's size and potential hazard. According to the "Recommended Guidelines for Safety Inspection of Dams" published by the U.S. Army Corps of Engineers, the SDF for N.J. No Name No. 56 Dam falls in a range of 100-year storm to 1/2 PMF. In this case, the low end of the range, 100-year storm is chosen since the factors used to select size and hazard classification are on the low side of their respective ranges.

The SDF peak computed for N.J. No Name No. 56 Dam is 3183 c.f.s. This value is derived from the 100-year flood hydrograph computed by the use of the HEC-1-DAM Flood Hydrograph Computer Program using the Soil Conservation Service triangular unit hydrograph method with curvilinear transformation. Hydrologic computations and computer output are contained in Appendix 4.

The spillway discharge rates were computed by analysis of critical depth flow at the entrance to a channel. The spillway discharge with lake level equal to the top of the dam was computed to be 189 c.f.s. The SDF was routed through the dam by use of the HEC-1-DAM computer program using the modified Puls method. In routing the SDF, it was found that the dam crest would be overtopped by a depth of 2.1 feet. Accordingly, the subject spillway is assessed as being inadequate in accordance with criteria developed by the U.S. Army Corps of Engineers.

b. Experience Data

Reportedly, the dam has been overtopped in the past. No damage to downstream structures was reported at the time of the overtoppings.

c. Visual Observation

Severe erosion of the spillway discharge channel was observed at the time of inspection. Also, the observed irregular shape of the downstream face of dam could be due to overtopping erosion.

d. Overtopping Potential

As indicated in paragraph 5.1.a. a storm of magnitude equal to the SDF would cause overtopping of the dam by a depth of 2.1 feet over the crest of the dam. The spillway is capable of passing approximately 6 percent of the SDF with lake level equal to the top of dam.

e. Drawdown Data

No drawdown computations can be performed due to the apparent absence of a functioning low level outlet.

SECTION 6: STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

The dam appeared, at the time of inspection to be outwardly structurally sound with no evidence of cracks or distress. The crest and the downstream face of the dam however, appeared to be irregularly shaped, possibly due to erosion.

b. Generalized Soils Description

The generalized soils description of the dam site consists of clay and silt deposited during the Wisconsin glaciation intermingled with recent alluvium composed laregly of gravel and sand deposited by streams. The glacial moraine overlies shale and sandstone bedrock known as the Brunswick Formation.

c. Design and Construction Data

Analyses of structural stability and construction data for the embankment are not available.

d. Operating Records

No operating records are available for the dam. The water level of the lake impounded by N.J. No Name No. 56 Dam is not monitored.

e. Post-Construction Changes

Reportedly, there have been no post-construction changes since the dam was constructed in 1960.

f. Seismic Stability

N.J. No Name No. 56 Dam is located in Seismic Zone 1 as defined in "Recommended Guidelines for Safety Inspection of Dams" which is a zone of very low seismic activity. Experience indicates that dams in Seismic Zone 1 will have adequate stability under seismic loading conditions if they have adequate stability under static loading conditions. N.J. No Name No. 56 Dam appeared to be stable under static loading conditions at the time of inspection.

SECTION 7: ASSESSMENT AND RECOMMENDATIONS

7.1 Dam Assessment

a. Safety

Based on hydraulic and hydrologic analyses outlined in Section 5 and Appendix 4, the spillway of the subject dam is assessed as being inadequate. The spillway is not able to pass the SDF without an overtopping of the dam.

The embankment appeared, at the time of inspection to be outwardly stable. The crest and the downstream face of the dam, however, appeared to be in deteriorated condition, possibly due to erosion.

b. Adequacy of Information

Information sources for this report include 1) field inspections, 2) USGS quadrangle, 3) plans on file with the Hanover Township Engineering Department, 4) consultation with personnel of the Hanover Township Engineering Department, 5) consultation with personnel of the Whippany Paper Board Company. The information obtained is sufficient to allow a Phase I assessment as outlined in "Recommended Guidelines for Safety Inspection of Dams."

Some of the absent data are as follows:

1. Construction and as-built drawings
2. Description of fill material for embankment.
3. Design computations and reports.
4. Maintenance documentation.
5. Soils report for the site.

c. Necessity for Additional Data/Evaluation

Although some data pertaining to N.J. No. Name No. 56 Dam are not available, additional data are not considered imperative for this Phase I evaluation.

7.2 Recommendations

a. Remedial Measures

Based on hydraulic and hydrologic analyses outlined in paragraph 5.1.a, the spillway is considered to be inadequate. It is therefore recommended that a professional engineer experienced in the design and construction of dams be engaged in the near future to perform more accurate hydraulic and hydrologic analyses. Based on the findings of these analyses, the need for and type of remedial measures should be determined and then implemented.

The owner should, in the near future develop an emergency plan together with an effective warning system outlining actions to be taken by the operator to minimize the downstream effects of an emergency at the dam.

In addition, it is further recommended that the following remedial measures be undertaken by the ownr in the near future.

1) Erosion of the channel immediately downstream of the dam should be repaired and the channel properly stabilized.

2) All trees and adverse vegetation on the embankment should be removed, and the embankment suitably graded and protected against erosion.

3) The concrete wall along the upstream side of embankment should be repaired.

b. Maintenance

In the future, the owner of the dam should develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam.

PLATES

N.J. No Name No. 56 DAM

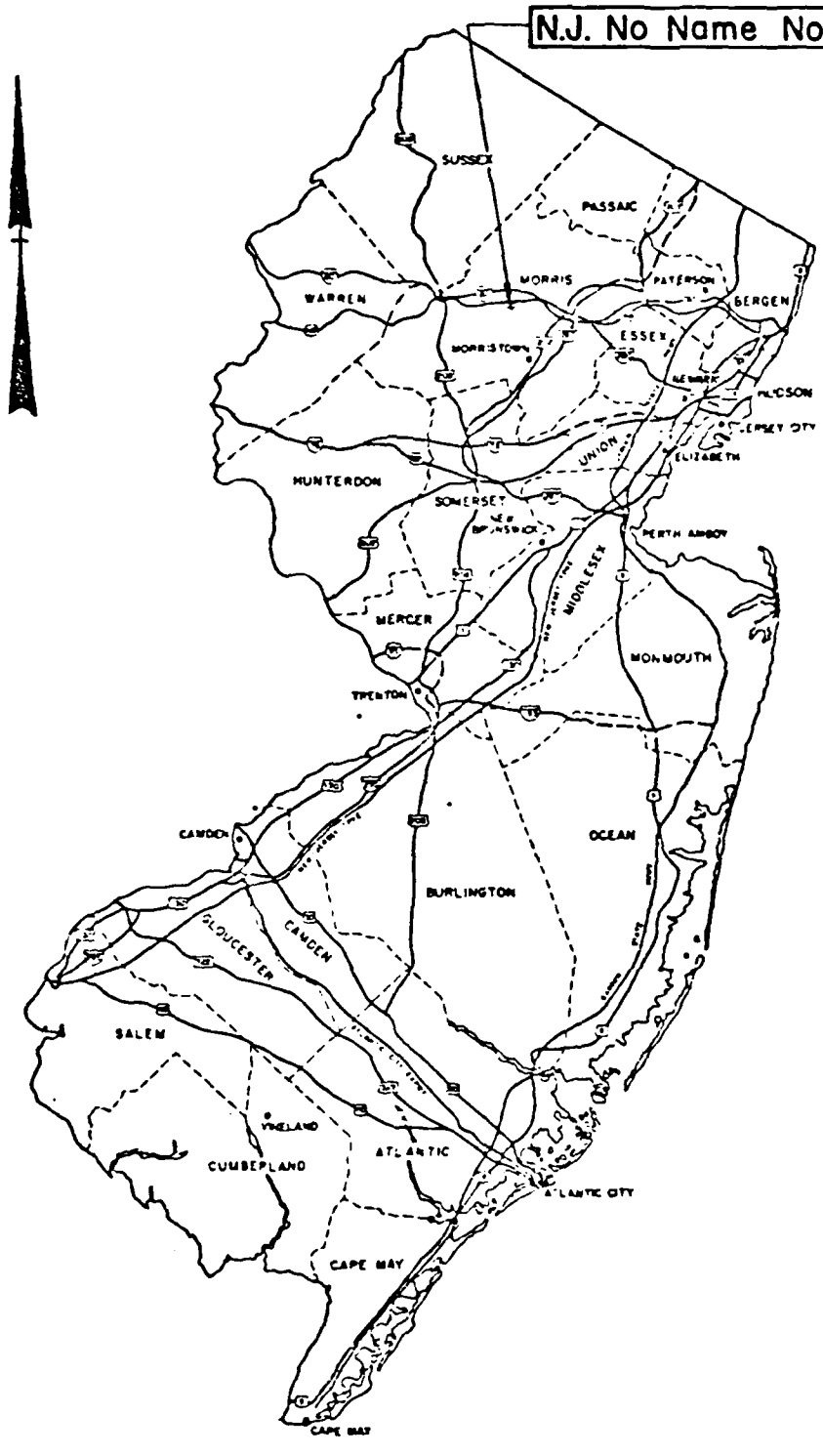
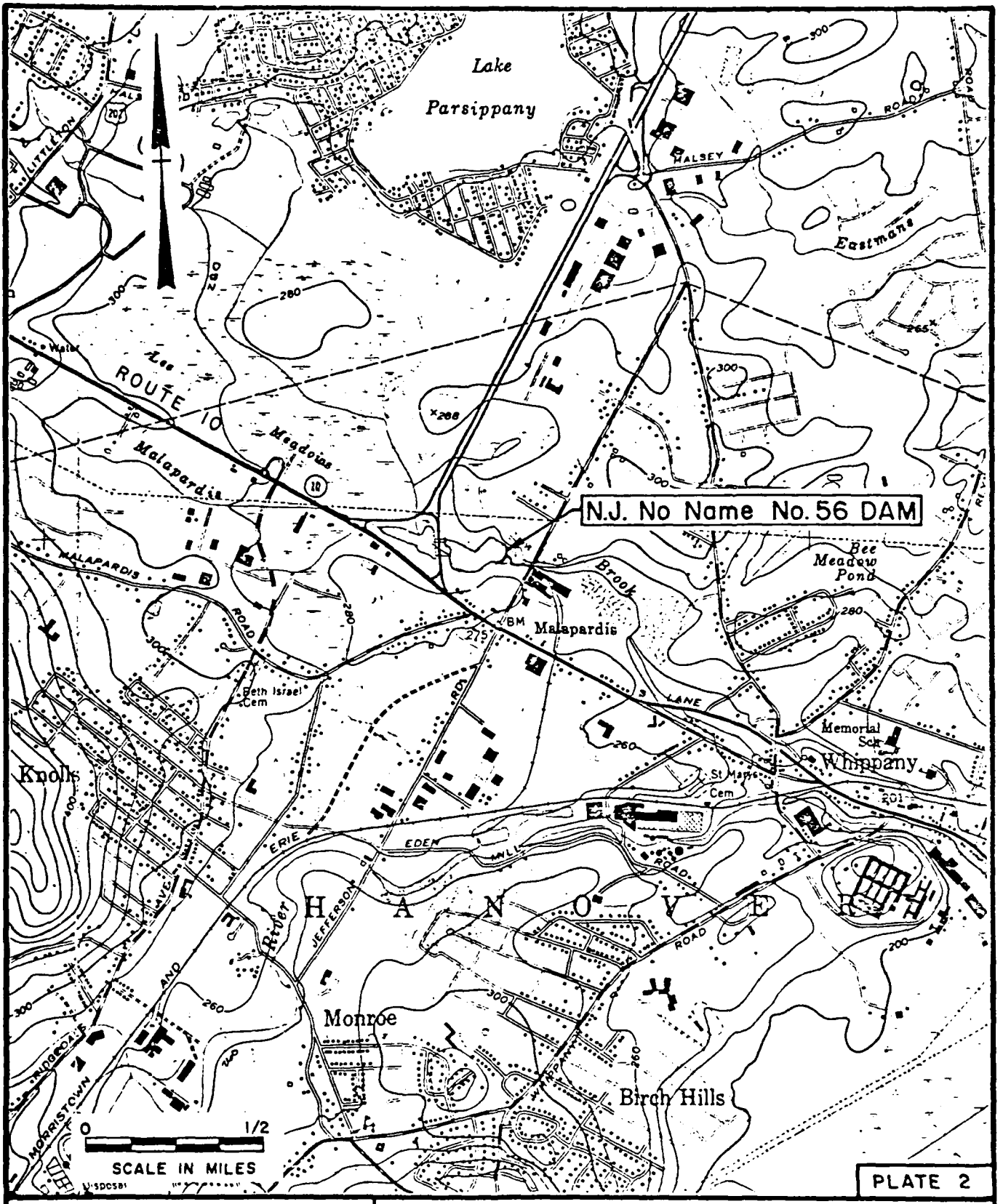


PLATE 1

STORCH ENGINEERS FLORHAM PARK, NEW JERSEY	INSPECTION AND EVALUATION OF DAMS KEY MAP N.J. No Name No. 56 DAM
DIVISION OF WATER RESOURCES N.J. DEPT. OF ENVIR. PROTECTION TRENTON, NEW JERSEY	SCALE: NONE DATE: FEB. 1981



STORCH ENGINEERS
FLORHAM PARK, NEW JERSEY

DIVISION OF WATER RESOURCES
N.J. DEPT. OF ENVIR. PROTECTION
TRENTON, NEW JERSEY

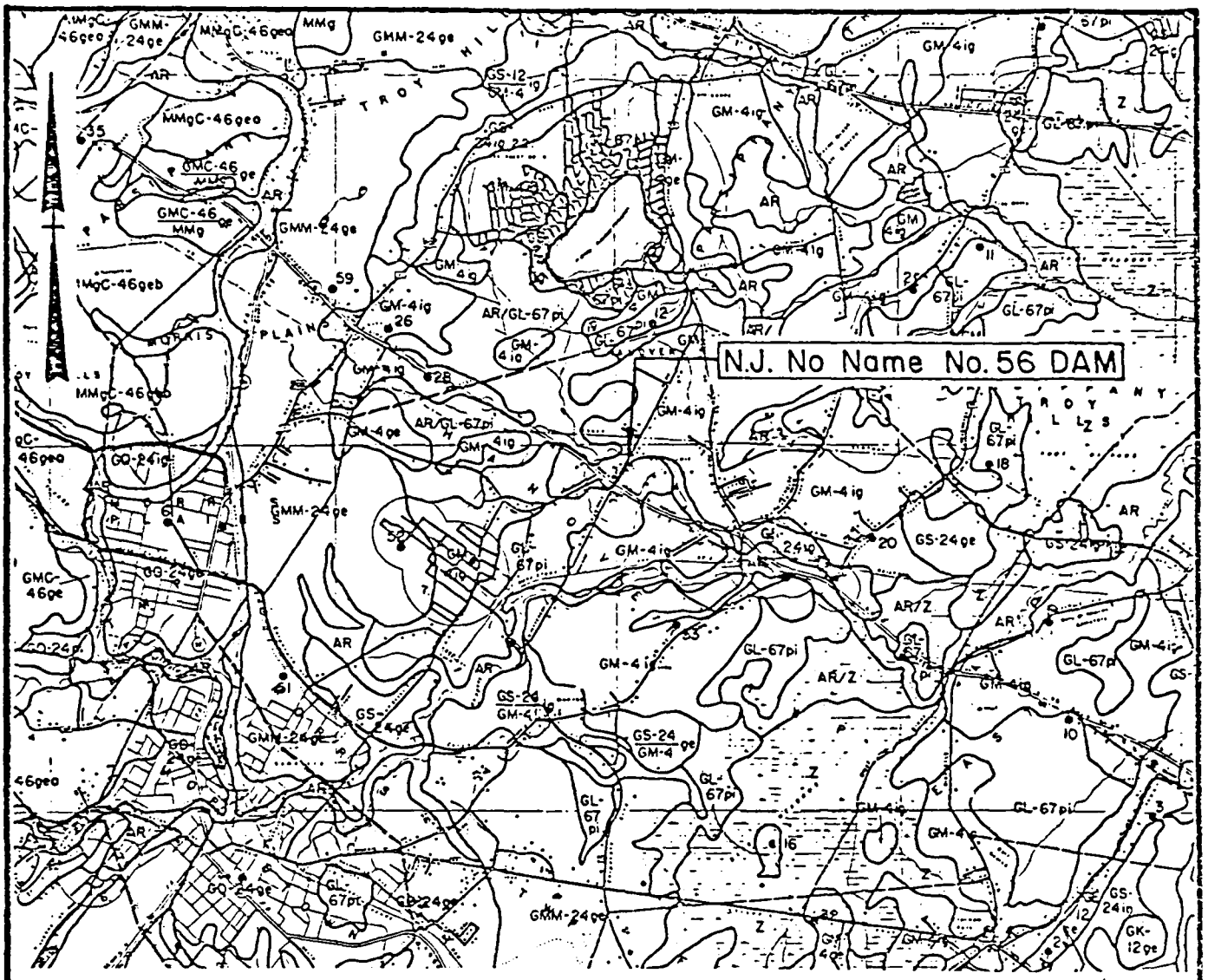
INSPECTION AND EVALUATION OF DAMS

VICINITY MAP

N.J. No Name No. 56 DAM

SCALE: AS SHOWN

DATE: FEB. 1981



Legend

AR/GL-67	Remains of glacial lake bed deposits, composed of stratified materials, and intermingled with recent alluvium placed by streams.
GM-4	Glacial ground moraine; composed of unstratified material deposited during the Wisconsin glaciation.
Note:	Information taken from: Rutgers University, Engineering Soil Survey of New Jersey, Report No. 9, Morris County, November 1953 and Geologic Map of New Jersey prepared by J. V. Lewis and H. Kummel 1910-1912, revised by H. B. Kummel 1931 and M. Johnson 1950.

PLATE 3

STORCH ENGINEERS
FLORHAM PARK, NEW JERSEY.

DIVISION OF WATER RESOURCES
N.J. DEPT. OF ENVIR. PROTECTION
TRENTON, NEW JERSEY.

INSPECTION AND EVALUATION OF DAMS

SOIL MAP

N.J. No Name No. 56 DAM

SCALE: NONE

DATE: FEB. 1981

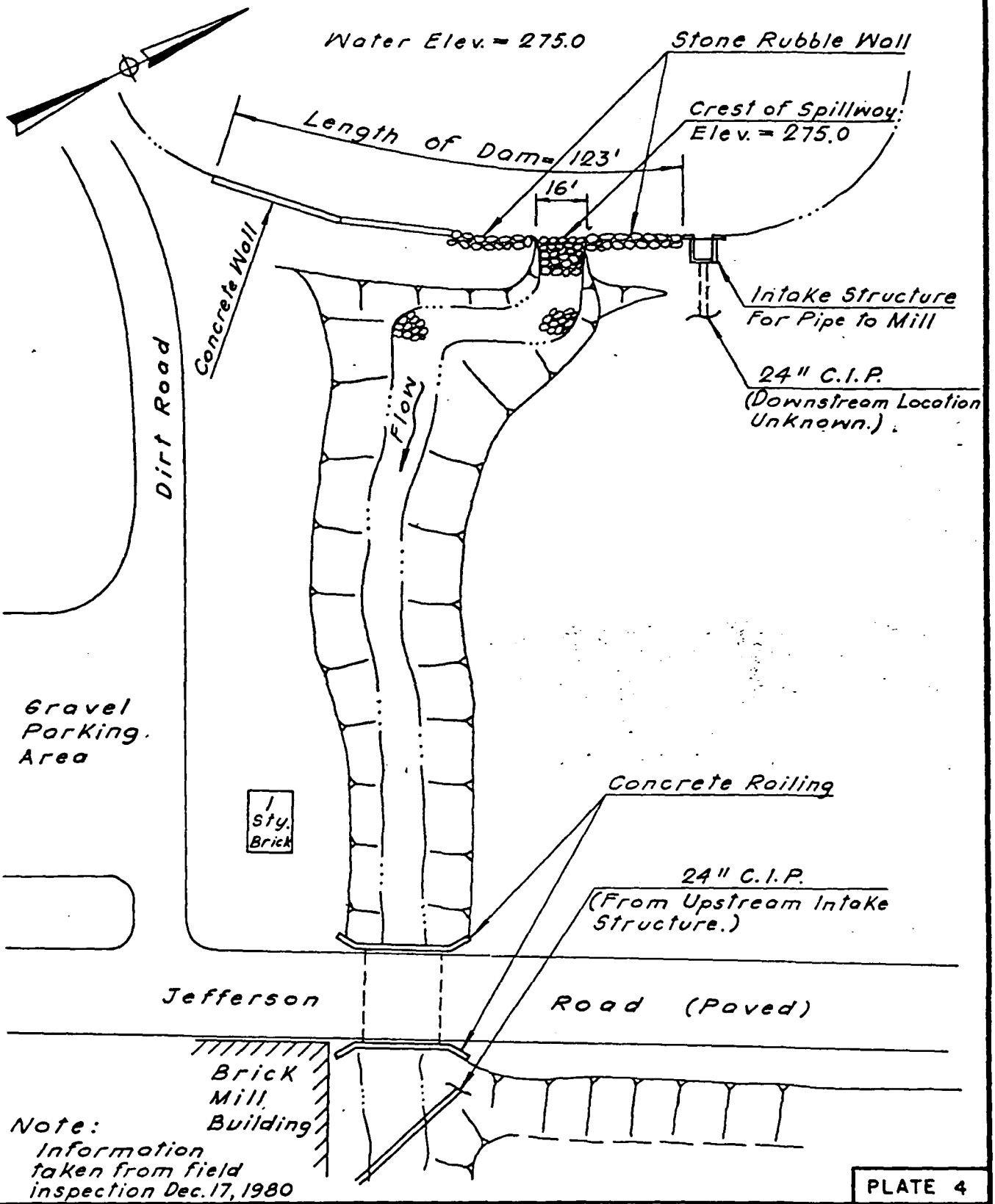


PLATE 4

STORCH ENGINEERS
FLORHAM PARK, NEW JERSEY

DIVISION OF WATER RESOURCES
N.J. DEPT. OF ENVIR. PROTECTION
TRENTON, NEW JERSEY

INSPECTION AND EVALUATION OF DAMS

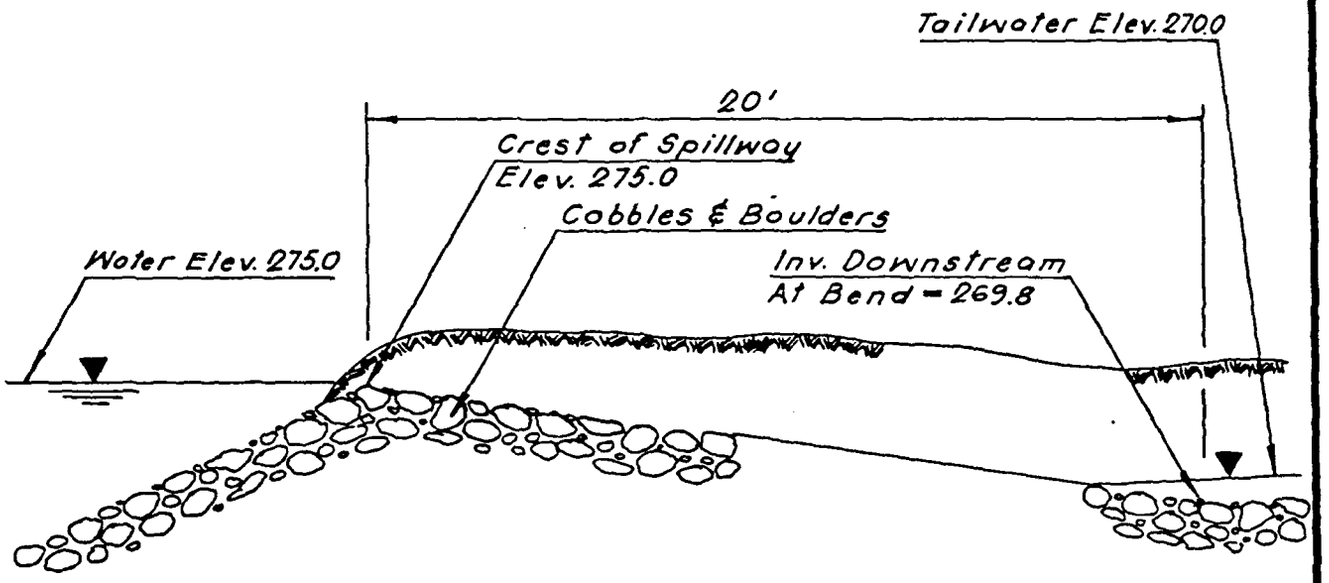
GENERAL PLAN

N.J. NO NAME Nº 56 DAM

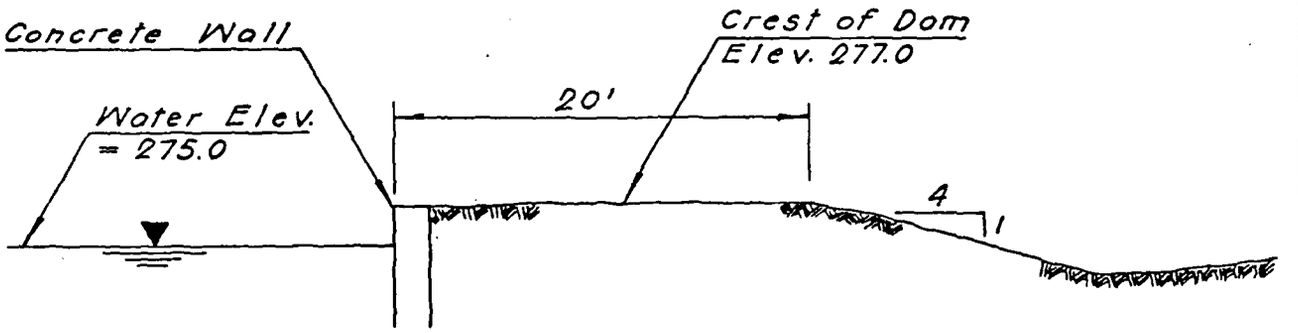
I.D. N.J. 00804

SCALE: NONE

DATE: FEB. 1981



SPILLWAY SECTION



TYPICAL DAM SECTION

Note:
Information taken from field inspection December 17, 1980

PLATE 5

STORCH ENGINEERS FLORHAM PARK, NEW JERSEY	INSPECTION AND EVALUATION OF DAMS SECTIONS N.J. NO NAME Nº 56 DAM
DIVISION OF WATER RESOURCES N.J. DEPT. OF ENVIR. PROTECTION TRENTON, NEW JERSEY	I.D.N.J. 00804 | SCALE: NONE DATE: FEB. 1981

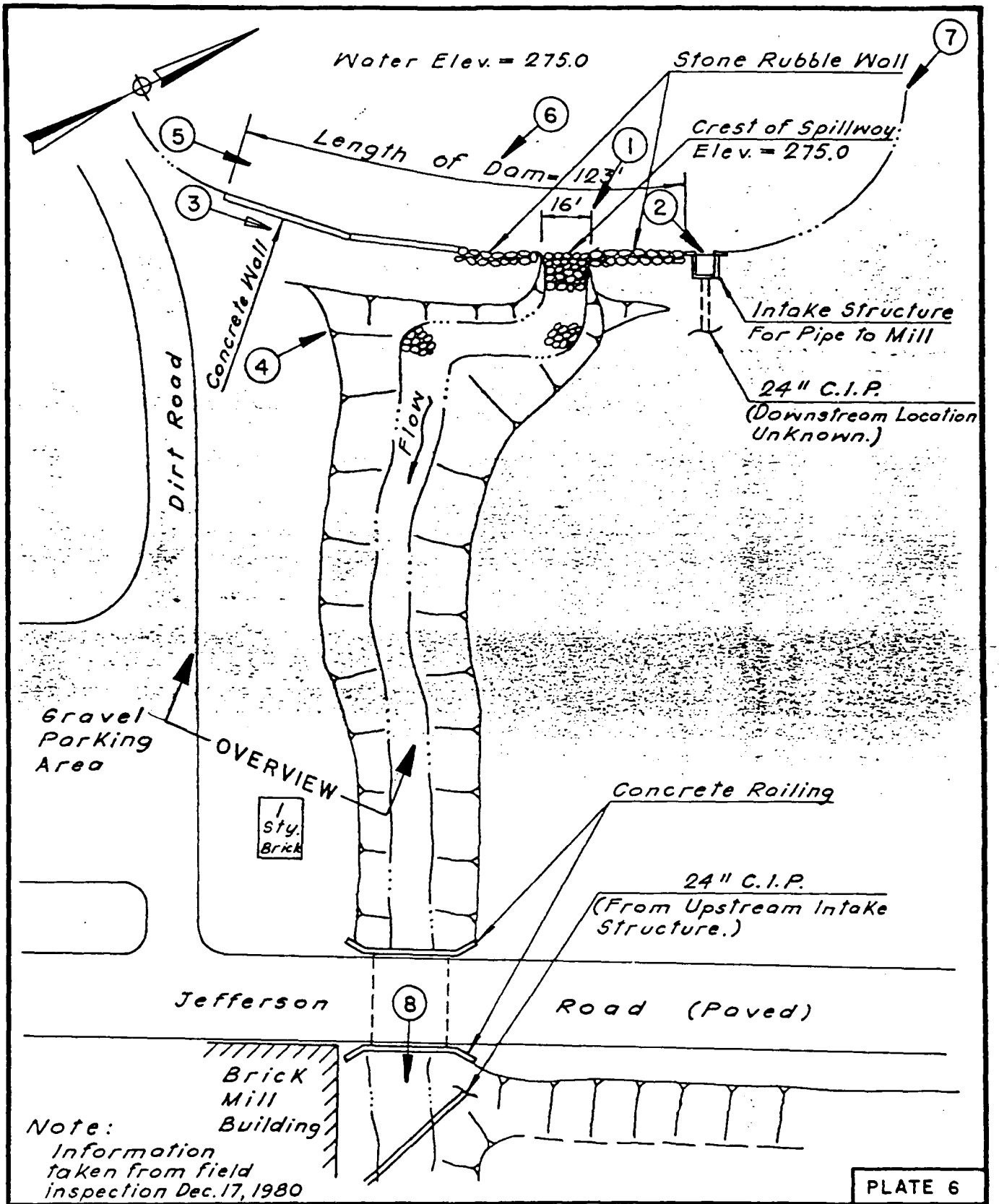


PLATE 6

STORCH ENGINEERS FLORHAM PARK, NEW JERSEY	INSPECTION AND EVALUATION OF DAMS PHOTO LOCATION PLAN N.J. NO NAME Nº 56 DAM
DIVISION OF WATER RESOURCES N.J. DEPT. OF ENVIR. PROTECTION TRENTON, NEW JERSEY	I.D. N.J. 00804 | SCALE: NONE DATE: FEB. 1981

APPENDIX 1

Check List - Visual Inspection

Check List - Engineering Data

Check List

Visual Inspection

Phase I

Name of Dam N.J. No Name 56 Dam County Morris State N.J. Coordinators NJDEP

Date(s) Inspection 12/17/80 Weather Sunny Temperature 20°F

Pool Elevation at time of Inspection 275.0 M.S.L. Tailwater at Time of Inspection 270.0 M.S.L.

Inspection Personnel:

John Gribbin — Richard McDermott

Charles Osterkorn

Daniel Buckelew

John Gribbin Recorder

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
GENERAL	Crest covered with weeds. Downstream face covered with weeds and small trees and not well defined. Conc. wall forming upstream face (right side) in fair condition. Stone rubble wall forming upstream face (left side) in fair condition.	Trees and weeds should be removed. Conc. wall should be repaired.
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Junctions appeared stable.	
ANY NOTICEABLE SEEPAGE	None observed.	
STAFF GAGE AND RECORDER	None observed.	
DRAINS	None observed.	

EMBANKMENT

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None observed.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None observed.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	None observed.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Vertical: generally level Horizontal: irregular	
RIPRAP	None observed.	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SURFACES IN OUTLET CONDUIT	Outlet conduit composed of cast iron, could not be observed in vicinity of dam. Conduit above ground in vicinity of downstream mill building appeared to be in satisfactory condition.	Function of outlet conduit unknown. Operating condition of outlet conduit unknown. Operating mechanism not observed.
INTAKE STRUCTURE	Concrete surfaces in satisfactory condition. Fish screens appeared to be in satisfactory condition, but not observed below the water line.	
OUTLET STRUCTURE	Not observed.	Conduit enters mill building.
OUTLET CHANNEL	N/A	
GATE AND GATE HOUSING	Not observed.	Presence of gate unknown.

SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CREST	Crest formed by entrance section to chute, lined with small boulders. Boulders irregularly placed and appeared to provide insufficient erosion protection.	Crest should be properly stabilized.
APPROACH CHANNEL	N/A	
DISCHARGE CHANNEL	Formed by chute located on downstream side of dam. Bottom of chute lined with small boulders. Sides consist of earth banks. Banks significantly eroded at bend in chute (with exposed roots observed).	Channel sides and bottom should be properly stabilized.

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None observed.	
OBSERVATION WELLS	None observed.	
WEIRS	None observed.	
PIEZOMETERS	None observed.	
OTHER		

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Shores were grass covered with 5' high banks and flat to moderately sloping terrain beyond.	
SEDIMENTATION	Unknown.	
STRUCTURES ALONG BANKS	Industrial garage and yard located adjacent to left side at upstream end. Road bridge crosses reservoir near upstream end.	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTION, DEBRIS, ETC.)	Between dam and bridge 350' downstream, channel is natural stream with rocky bottom and wooded banks. Downstream from bridge, stream meanders through mill complex.	
SLOPES	Banks high with slopes of approx. 1 horizontal to 1 vertical.	
STRUCTURES ALONG BANKS	Road bridge (Jefferson Road) located 350' downstream. Mill building adjacent to stream located immediately below bridge. Brick weigh station located adjacent to channel immediately upstream from Jefferson Road bridge.	

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

ITEM			REMARKS
DAM	-	PLAN	Not Available
		SECTIONS	
SPILLWAY	-	PLAN	Not Available
		SECTIONS	
		DETAILS	
OPERATING EQUIPMENT PLANS & DETAILS			Not Available
OUTLETS	-	PLAN	Not Available
		DETAILS	
		CONSTRAINTS	
		DISCHARGE RATINGS	
HYDRAULIC/HYDROLOGIC DATA			Not Available
RAINFALL/RESERVOIR RECORDS			Not Available
CONSTRUCTION HISTORY			Not Available
LOCATION MAP			Not Available

ITEM	REMARKS
DESIGN REPORTS	Not Available
GEOLOGY REPORTS	Not Available
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM INSTABILITY SEEPAGE STUDIES	Not Available
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	Not Available
POST-CONSTRUCTION SURVEYS OF DAM	Not Available
BORROW SOURCES	Not Available

ITEM	REMARKS
MONITORING SYSTEMS	Not Available
MODIFICATIONS	Not Available
HIGH POOL RECORDS	Not Available
POST CONSTRUCTION ENGINEERING *STUDIES AND REPORTS*	Drawings relating to pending lake lowering permit available in the files of the Hanover Twp. Engineering Department, P.O. Box 250, Whippany, New Jersey, 07981.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	Not Available
MAINTENANCE OPERATION RECORDS	Pending lake lowering permit (see above)

APPENDIX 2

Photographs

PHOTO 1
SPILLWAY

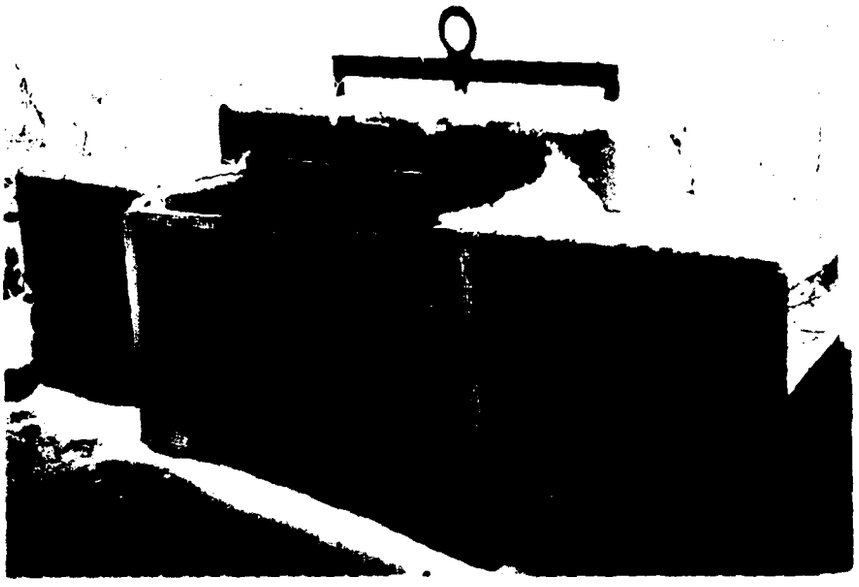


PHOTO 2
INTAKE STRUCTURE FOR PIPE TO MILL

NJ NO NAME No. 56 DAM
17 DECEMBER 1980

PHOTO 3
CREST OF EMBANKMENT

PHOTO 4
DOWNSTREAM FACE OF EMBANKMENT

NJ NO NAME No. 56 DAM
17 DECEMBER 1980

PHOTO 5

UPSTREAM FACE OF EMBANKMENT

PHOTO 6

UPSTREAM FACE OF EMBANKMENT - RIGHT SIDE

NJ NO NAME No. 56 DAM
17 DECEMBER 1980

20 JANUARY 1981

PHOTO 7

AERIAL VIEW OF LAKE AND DOWNSTREAM CHANNEL

17 DECEMBER 1980

PHOTO 8

DOWNSTREAM CHANNEL ADJACENT TO MILL BUILDING

APPENDIX 3

Engineering Data

CHECK LIST

HYDROLOGIC AND HYDRAULIC DATA

ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: Wooded, residential and swampy areas

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 275.0 (15 acre-feet)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): N/A

ELEVATION MAXIMUM DESIGN POOL: 279.1

ELEVATION TOP DAM: 277.0

SPILLWAY CREST: Boulder lined channel

a. Elevation 275.0

b. Type Chute (trapezoidal section)

c. Width 16 feet

d. Length 20 feet

e. Location Spillover Downstream side of dam

f. Number and Type of Gates N/A

OUTLET WORKS: 24-inch C.I.P. connected to downstream mill building

a. Type Pipe conduit

b. Location Left end of dam

c. Entrance Invert Unknown

d. Exit Invert Unknown (pipe enters mill bldg.)

e. Emergency Draindown Facilities: None

HYDOMETEOROLOGICAL GAGES: None

a. Type N/A

b. Location N/A

c. Records N/A

MAXIMUM NON-DAMAGING DISCHARGE:

(Lake Stage Equal to Top of Dam) 189 c.f.s.

APPENDIX 4

Hydraulic/Hydrologic Computations

STORCH ENGINEERS

Sheet 1 of 12

Project N.J. NO NAME NO. 56 Made By T.D. Date 2-23-81

1132-05 Chkd By JG Date 2/23/81

HYDROLOGY

HYDROLOGIC ANALYSIS

RUNOFF HYDROGRAPH WILL BE DEVELOPED BY HEC-1 DAM USING S.C.S TRIANGULAR HYDROGRAPH WITH CURVILINEAR TRANSFORMATION.

DRAINAGE AREA = 4.55 SQ. MI.

INFILTRATION DATA

INITIAL INFILTRATION 1.0 IN.

CONSTANT INFILTRATION 0.10 IN/HR.

TIME OF CONCENTRATION - SUMMARY (SEE ATTACHED SHEETS)

METHOD	T_c (HR)
METHOD #1, S.C.S. TR-55	5.76
METHOD #2, CHOW	2.89
METHOD #3, N.J.H.A. & D.E.P. NOMOGRAPH	2.60
METHOD #4 TEXAS HIGHWAY DEPT. & TP PW-5	3.56

FOR COMPUTER INPUT:

T_c = 4.2 HR

LAG TIME = 60% Tc = 2.5 Hr

TIME OF CONCENTRATION

S.C.S TR-55 (Tc METHOD #1)

OVERLAND FLOW: L = 3500'
Δ ELEV. = 60'
S = 1.71%
V = 0.31 F.P.S.
TIME 3.14 HR.

CHANNEL FLOW: L = 4000'
Δ ELEV = 80'
S = 2.00%
V = 2.8 F.P.S.
TIME 0.40 HR

L = 8,000'
Δ ELEV. = 20'
S = 0.25%
V = 1.0 F.P.S.
TIME 2.22 HR
Tc = 5.76 HR

"HANDBOOK OF APPLIED HYDROLOGY" BY CHOW, P 14-36, (Tc METHOD #2)

TIME OF CONCENTRATION = $Tc = \sqrt[2.14]{\frac{3}{3} \frac{L N}{S}}$

L = LENGTH OF FLOW (FT.)
S = SLOPE
N = COEFF. OF ROUGHNESS
Tc = TIME OF CONCENTRATION (MIN)

OVERLAND FLOW: L = 3500'
S = 0.0171
N = 0.40
TIME = 1.05 HR.

CHANNEL FLOW: L= 4000'
S= 0.0200
N= 0.10
TIME 0.57 HR

L= 9000'
S= 0.0075
N= 0.10
TIME = 1.27 HR
T_c = 2.69 HR

N.J. HIGHWAY AUTHORITY NOMOGRAPH (T_c METHOD #3)

OVERLAND FLOW: L= 3500'
S= 1.7%
AVERAGE GRASS
TIME = 0.92 HR

D.E.P. NOMOGRAPH (T_c METHOD # 3 CONT.)

CHANNEL FLOW: L= 4000'
ΔELEV.= 80'
TIME 0.30 HR.

L= 9000'
ΔELEV. = 70'
TIME = 1.3 HR
T_c = 2.60 HR

TEXAS HIGHWAY DEPT. "DESIGN OF SMALL DAMS" U.S. DEPT OF INTERIOR, P.70
(Tc METHOD # 4)

OVERLAND FLOW : L= 3500', S= 1.17%, N= 1.0 F.P.S.

TIME 0.97 HR.

NAVDOCKS TP-PW-5 "DESIGN OF SMALL DAMS" U.S. DEPT. OF INTERIOR, P.70
(Tc METHOD # 4 CONT.)

CHANNEL FLOW: L= 4000', S= 2.00%, N= 3.0 F.P.S.

TIME 0.37 HR.

L= 8000, S= 0.25%, N= 1.0 F.P.S.

TIME = 2.22 HR

Tc = 3.56 HR.

Project N. J. LAKE NO NAME NO. 56 DAM Made By JiHq Date 2-23-81

1132 - 05 Chkd By JG Date 2/23/81

24 HOURS, 100 YEAR RAINSTROM

DISTRIBUTION FOR LAKE NoName No. 56 DAM

TIME [Hr.]	RAIN [IN]
1	0.08
2	0.08
3	0.08
4	0.08
5	0.08
6	0.08
7	0.09
8	0.09
9	0.18
10	0.18
11	0.18
12	0.19
13	0.3
14	0.3
15	0.8
16	3.0
17	0.4
18	0.3
19	0.19
20	0.18
21	0.09
22	0.09
23	0.08
24	0.08
24 Hr	Σ 7.20

FROM TP 40. U.S. WEATHER BUREAU

Project N.J. NO NAME NO.56 DAM Made By JHG Date 2-23-81

1132-05 Chkd By JG Date 2/23/81

ELEVATION - SURFACE AREA TABLE

ELEVATION (FT.)	AREA (ACRES)
270.0	0
275.0	8.7
280.0	572.0
300.0	1,013.0

HEC-1-DAM COMPUTER WILL DEVELOP STORAGE CAPACITY FROM SURFACE AREAS AND ELEVATIONS

INFORMATION TAKEN FROM U.S.G.S QUADRANGLE, MORRISTOWN, N.J.

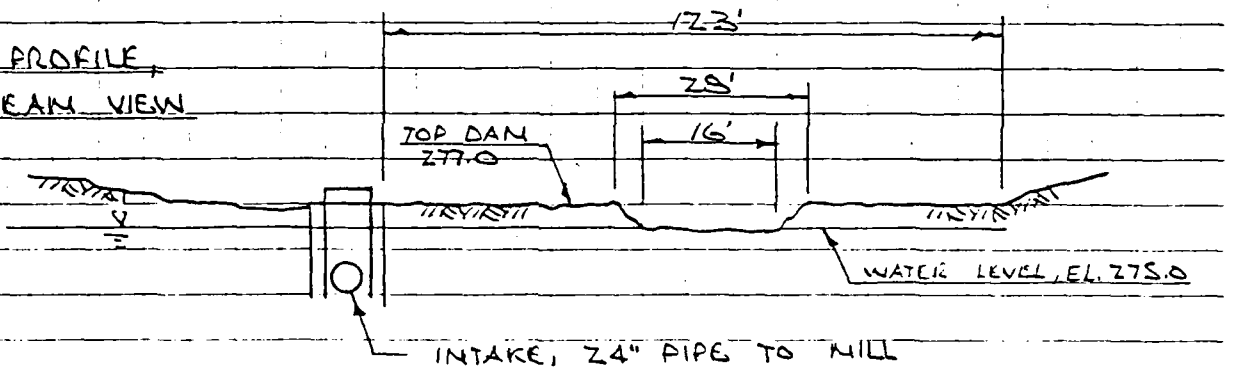
HYDRAULICS

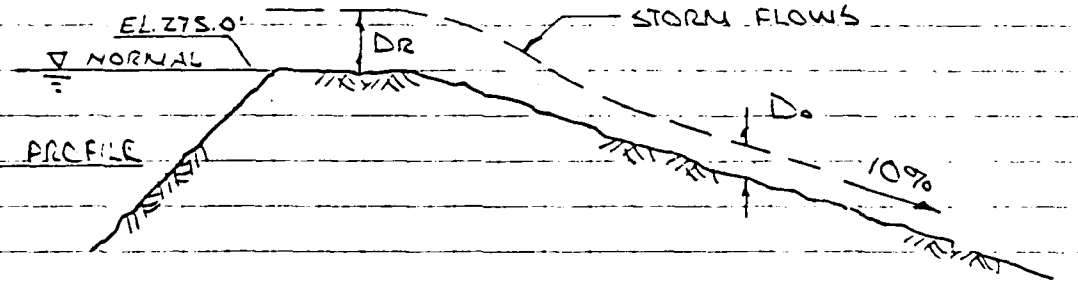
STAGE DISCHARGE CALCULATION

SPILLWAY CAPACITY:

THE PRIMARY SPILLWAY AT NO NAME NO. 56 IS A BROAD CRESTED RUBBLE CHUTE WITH AN EFFECTIVE LENGTH OF 75', AND CREST ELEVATION 275.0. THE TOP OF DAM ELEVATION IS 277.0

DAM PROFILE, UPSTREAM VIEW





SPILLWAY PROFILE

DISCHARGE Q, CAN BE CALCULATED BY:

$$Q = AR^{2/3} S^{\frac{1}{2}} \frac{1.486}{N}$$

V.T. CHOW "OPEN CHANNEL HYDRAULICS"

Q = FLOW, (C.F.S.)

R = HYDRAULIC RADIUS (FT.)

A = AREA, (S.F.)

S = SLOPE OF ENERGY GRADE LINE

N = MANNING'S COEFFICIENT (USE 0.050)

CHECK FOR CRITICAL FLOW:

$S_c = \frac{14.56\ N^2}{D_M^{1/3}}$ EQ 8:83 "HANDBOOK OF HYDRAULICS" BY BRATER AND KING

N= MANNINGS COEFFICIENT. (0.050)

D_M= MEAN DEPTH ≈ HYDRAULIC RADIUS - FT.

S_c= CRITICAL SLOPE -

$S_c = \frac{14.56(0.050)^2}{2^{1/3}} = 2.29\% < 10\%$ (CHANNEL SLOPE)

CHANNEL SLOPE EXCEEDS CRITICAL SLOPE

$Q = 2.5\ D_o (D_o)^{2/3} (0.1)^{1/2} \frac{1.486}{0.05}$ $A = 2.5\ D_o$

ASSUME $D_o = R$

$Q = 2.35\ D_o^{5/3}$

$D_R = D_o + \frac{Q^2}{2gA^2}$ EQ 8:86 "HANDBOOK OF HYDRAULICS" BY BRATER AND KING

$D_R = D_o + \frac{(2.35 D_o^{5/3})^2}{2(32.2)(2.5 D_o)^2}$ $g = 32.16\ FT/SEC^2$

A= AREA S.F.

Q= FLOW, C.F.S.

STAGE DISCHARGE TABULATION

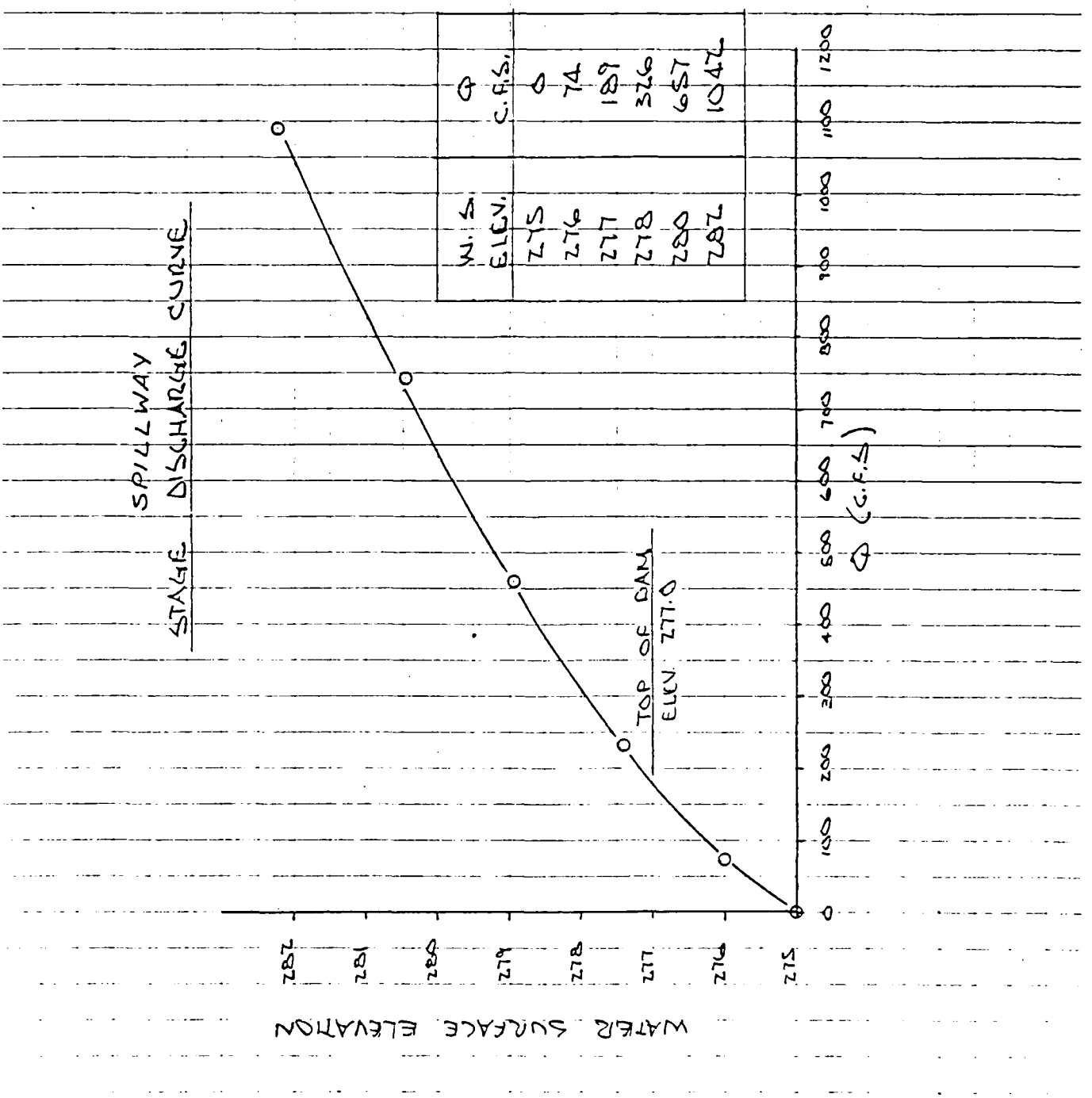
D_o (FT)	D_R (FT)	STAGE (FT)	Q (C.F.S)
0	0	275	0
0.5	1.04	276.0	74
1.0	2.37	277.4	235
1.5	3.96	278.9	467
2.0	5.46	280.5	746
2.5	7.16	282.2	1092

STORCH ENGINEERS

Sheet 9 of 12

Project N.J. NO NAME NO. 56 DAM Made By T.D. Date 2-23-81

1132.05 Chkd By JG Date 2/23/81



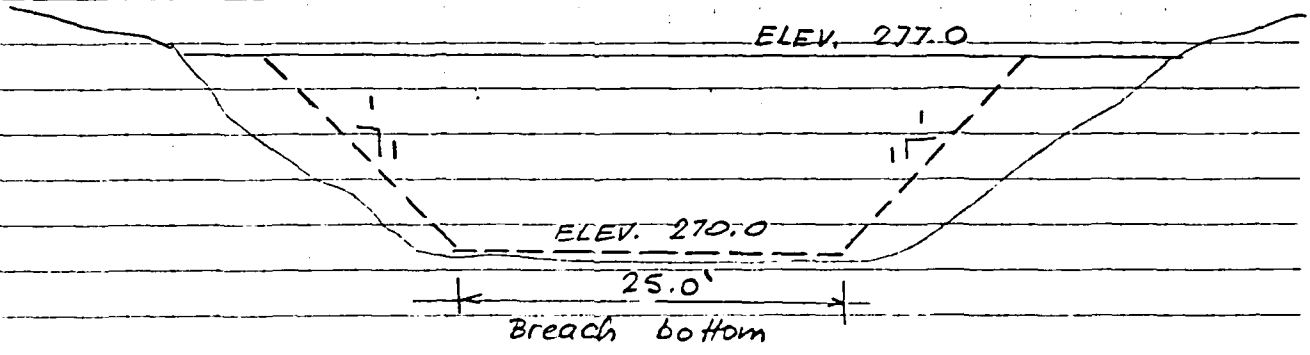
Project N.J. LAKE NoName No 56 DAM Made By JiHa Date 2-23-81

1132-05 Chkd By JG Date 2/23/81

BREACH ANALYSIS:

A BREACH HYDROGRAPH WILL BE COMPUTED BY THE HEC-1-DAM PROGRAM AND ROUTED THROUGH TWO DOWNSTREAM REACHES BY THE MODIFIED PLUS METHOD. THE ASSUMED BREACH CONDITIONS:

1. THE BREACH BEGINS WHEN THE W.S. ELEV. 277.0 FT
2. TIME FOR BREACH TO DEVELOP MAX. SIZE 1.0 Hr.
3. BREACH SECTION



BREACH RESULTS:

1. Peak outflow = 2535.0 [cfs]
2. Max. channel stage = 265.4 [FT]
   Reach 2 inv. 260.0 [FT]
3. Mill building inundated to a depth of approx. = 3.4 [FT]

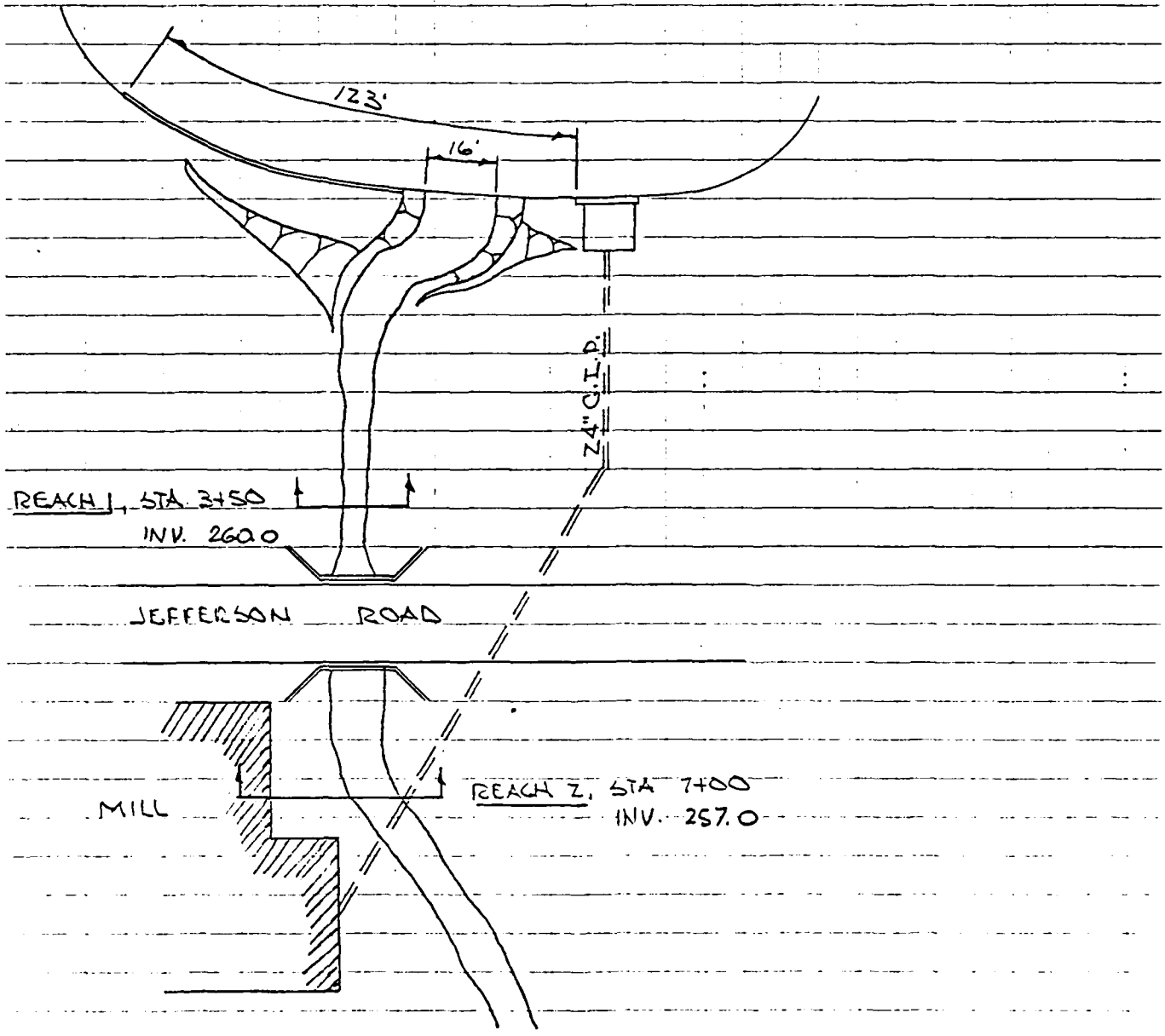
STORCH ENGINEERS

Sheet 11 of 12

Project N.J. NO NAME NO. 36 DAM Made By T.D. Date 2-23-81

1132-05 Chkd By JG Date 2/23/81

HYDROLOGY



STORCH ENGINEERS

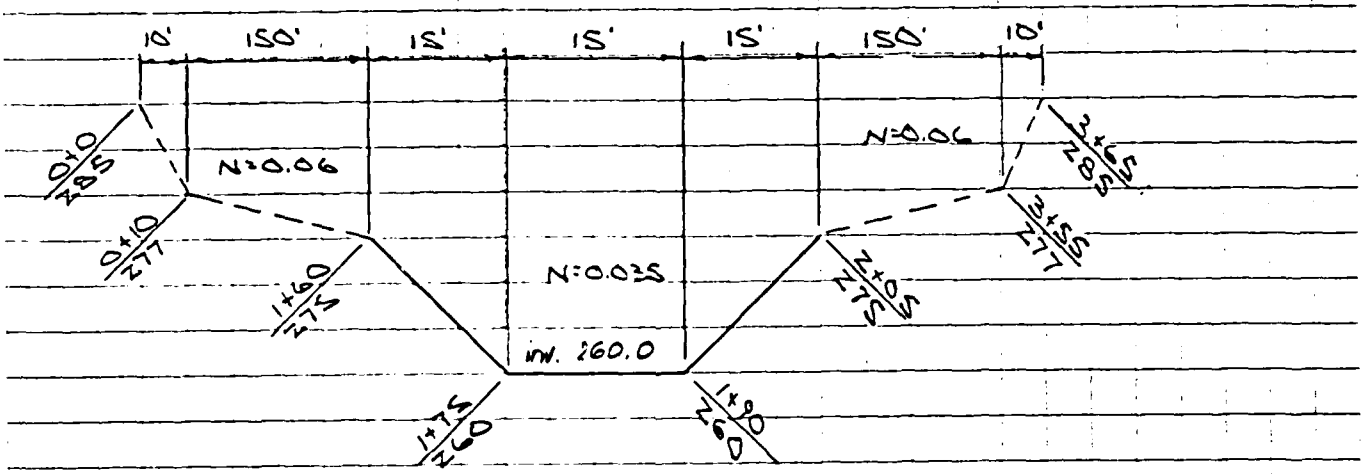
Sheet 12 of 12

Project N.J. NO NAME NO. 56 DAM Made By TD Date 2-23-81

Chkd By JG Date 2/23/81

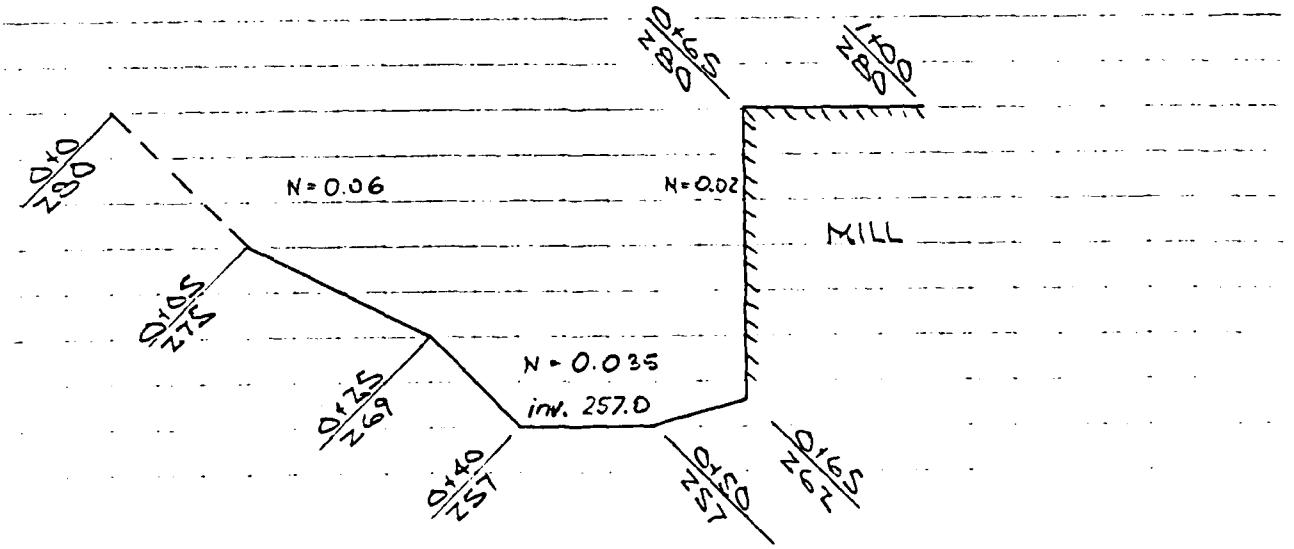
TYPICAL CROSS SECTION

REACH 1



STA. 3+50, FACING DOWNSTREAM

REACH 2



STA. 7+00, FACING DOWNSTREAM

HEC - 1 - DAM PRINTOUT

Overtopping Analysis

```
I1      NATIONAL DAM SAFETY PROGRAM
I2      LAKE NONAME #56 DAM, NEW JERSEY
I3      100 YEAR STORM ROUTING
R    300       0      15                                    0       0       4
B1     5
J      1       1       1
J1     1
K      0    LAKE                          0       0       1
K1        INFLOW HYDROGRAPH TO LAKE NONAME #56 DAM
N      0       2    4.55              4.55       0
O     96
O1 0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019
O1 0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019
O1 0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019
O1 0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019
O1 0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.038   0.038
O1 0.038   0.038   0.038   0.038   0.038   0.038   0.038   0.038   0.038   0.038
O1 0.083   0.083   0.083   0.083   0.163   0.163   0.163   0.163   0.750   0.750
O1 0.750   0.750   0.163   0.163   0.163   0.163   0.083   0.083   0.083   0.083
O1 0.083   0.083   0.083   0.083   0.038   0.038   0.038   0.038   0.038   0.038
O1 0.038   0.038   0.038   0.038   0.038   0.038
T                                                   1     0.1
W2        2.5
X   -1.0   -0.05    2.0
K      1     DAM                                    1       1
K1       ROUTE DISCHARGE THROUGH DAM
Y                                   1       1
Y1     1                                          -275      -1
YA   275     276     277     278     280     282
YS     0      74     189     326     657    1042
$A     0     8.7     572    1013
1E   270     275     280     300
$$   275
$D   277    2.63     1.5     107
K      1       1
K1       CHANNEL ROUTING REACH 1
Y                                   1       1
Y1     1
Y6  0.06   0.035    0.06     260     275     350  0.0280
Y7     0     285      10     277     160     275     175     260     190     260
YZ   205     275     355     272     365     285
K      1       2                                          1
K1       CHANNEL ROUTING REACH 2
Y                                   1       1
Y1     1
Y6  0.06   0.035    0.02     257     275     350  0.0086
YZ     0     280       5     275      25     269      40     252      50     252
Y7    65     262      65     280     100     280
K     99
6
6
A
```

NATIONAL DAM SAFETY PROGRAM
LAKE NONAME #56 DAM, NEW JERSEY
100 YEAR STORM ROUTING

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
300	0	15	0	0	0	0	0	4	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 1 LRTIO= 1

RTIOS= 1.00

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SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH TO LAKE NONAME #56 DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LAKE	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	2	4.55	0.00	4.55	0.00	0.000	0	0	0

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.10	0.00	0.00

UNIT HYDROGRAPH DATA
TC= 0.00 LAG= 2.50

RECESSION DATA
STRTQ= -1.00 QRCSN= -.05 RTIOR= 2.00

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	7.12	4.98	2.14	59877.
										(181.)	(127.)	(54.)	(1695.53)

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HYDROGRAPH ROUTING

ROUTE DISCHARGE THROUGH DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
DAM	1	0	0	0	1	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-275.	-1

STAGE	275.00	276.00	277.00	278.00	280.00	282.00
FLOW	0.00	74.00	189.00	326.00	657.00	1042.00
SURFACE AREA=	0.	9.	572.	1013.		
CAPACITY=	0.	15.	1100.	16741.		
ELEVATION=	270.	275.	280.	300.		

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
275.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
277.0	2.6	1.5	102.

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1

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO APPLIED TO FLOWS RATIO 1 1.00
HYDROGRAPH AT	LAKE	4.55 (11.78)	1	3183. (90.14)(
ROUTED TO	DAM	4.55 (11.78)	1	1349. (38.21)(
ROUTED TO	1	4.55 (11.78)	1	1349. (38.20)(
ROUTED TO	2	4.55 (11.78)	1	1350. (38.22)(

1 SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	275.00	275.00	277.00
STORAGE	15.	15.	128.
OUTFLOW	0.	0.	189.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	279.08	2.08	654.	1349.	18.00	22.75	0.00

PLAN 1 STATION 1

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
1.00	1349.	264.5	22.75

PLAN 1 STATION 2

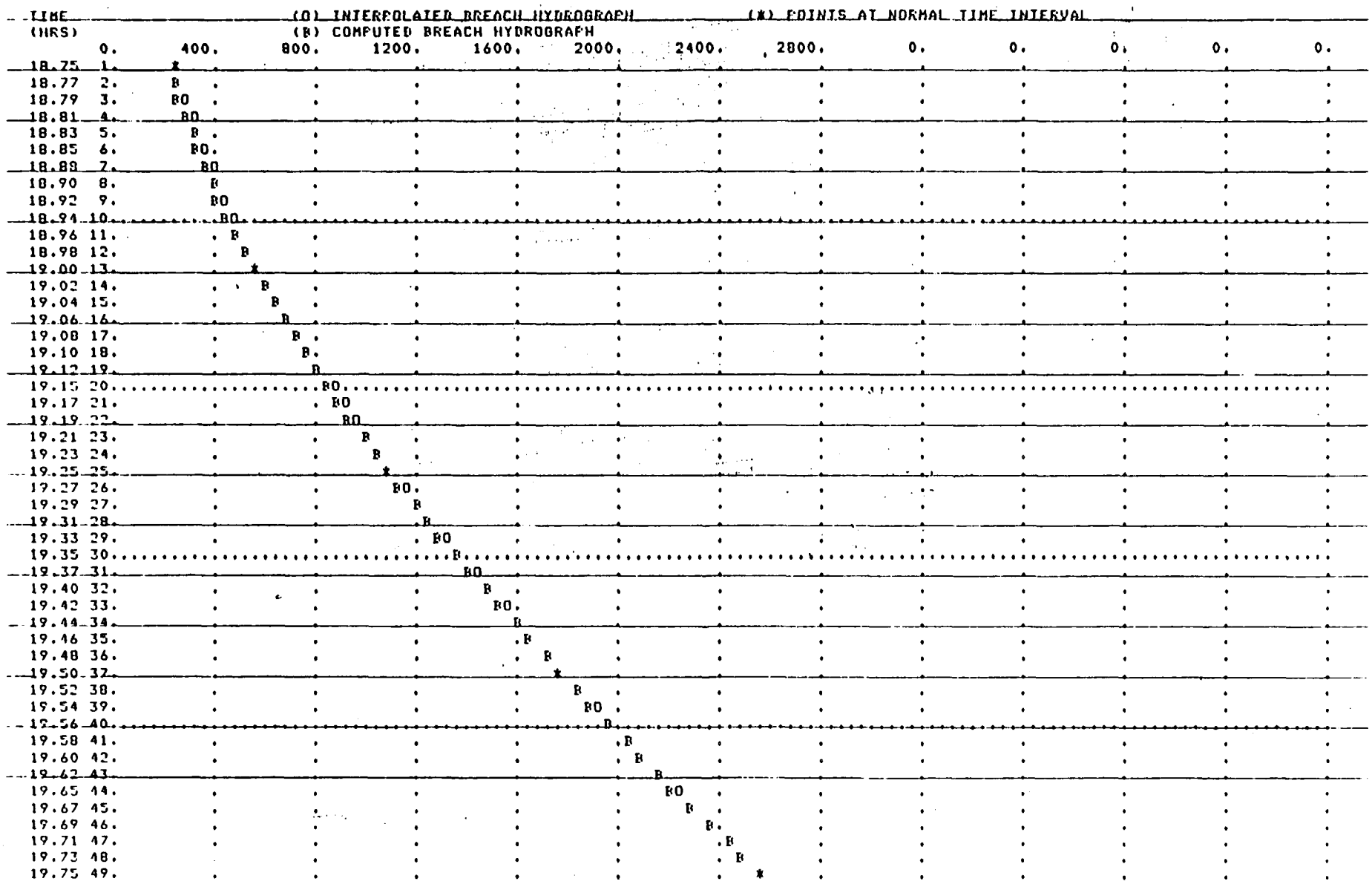
RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
1.00	1350.	263.1	22.75

FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79

HEC - 1 - DAM PRINTOUT

Breach Analysis

```
1A1                    NATIONAL DAM SAFETY PROGRAM
 A2                  LAKE NONAME #56 DAM, NEW JERSEY
 A3                  100 YEAR STORM ROUTING
 B     300       0       15                              0       0       4
 B1      5
 J       1       1       1
 J1      1
 K       0    LAKE                          0       0       1
 K1          INFLOW HYDROGRAPH TO LAKE NONAME #56 DAM
 M       0       2    4.55             4.55       0
 O      96
 O1 0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019
 O1 0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019
 O1 0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019
 O1 0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019
 O1 0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.019   0.038   0.038
 O1 0.038   0.038   0.038   0.038   0.038   0.038   0.038   0.038   0.038   0.038
 O1 0.083   0.083   0.083   0.083   0.163   0.163   0.163   0.163   0.750   0.750
 O1 0.750   0.750   0.163   0.163   0.163   0.163   0.083   0.083   0.083   0.083
 O1 0.083   0.083   0.083   0.083   0.038   0.038   0.038   0.038   0.038   0.038
 O1 0.038   0.038   0.038   0.038   0.038   0.038
 T                                               1    -0.1
 W2          2.5
 X    -1.0   -0.05    2.0
 K       1     DAM                         1       1
 K1          ROUTE DISCHARGE THROUGH DAM
 Y                                   1       1
 Y1      1                                           -275      -1
 Y4    275     276     277     278     280     282
 Y5      0      74     189     326     657    1042
 $A      0     8.7     572    1013
 $C    270     275     280     300
 $$    275
 $D    277    2.63     1.5     107
 $B     25       1     270     1.0     275     277
 K       1       1
 K1          CHANNEL ROUTING REACH 1
 Y                                   1       1
 Y1      1
 Y6   0.06   0.035    0.06     260     275     350  0.0280
 Y7      0     285      10     277     160     275     175     260     190     260
 Y7    205     275     355     277     365     285
 K       1       2                                       1
 K1          CHANNEL ROUTING REACH 2
 Y                                   1       1
 Y1      1
 Y6   0.06   0.035    0.02     252     275     350  0.0086
 Y7      0     280       5     275      25     269      40     257      50     257
 Y7     65     262      65     280     100     280
 K      99
 A
 A
 A
```


TIME
(HRS)
(O) INTERPOLATED BREACH HYDROGRAPH
(B) COMPUTED BREACH HYDROGRAPH
(*) POINTS AT NORMAL TIME INTERVAL
0. 400. 800. 1200. 1600. 2000. 2400. 2800. 0. 0. 0. 0. 0.
18.75 1.
18.77 2.
18.79 3.
18.81 4.
18.83 5.
18.85 6.
18.88 7.
18.90 8.
18.92 9.
18.94 10.
18.96 11.
18.98 12.
19.00 13.
19.02 14.
19.04 15.
19.06 16.
19.08 17.
19.10 18.
19.12 19.
19.15 20.
19.17 21.
19.19 22.
19.21 23.
19.23 24.
19.25 25.
19.27 26.
19.29 27.
19.31 28.
19.33 29.
19.35 30.
19.37 31.
19.40 32.
19.42 33.
19.44 34.
19.46 35.
19.48 36.
19.50 37.
19.52 38.
19.54 39.
19.56 40.
19.58 41.
19.60 42.
19.62 43.
19.65 44.
19.67 45.
19.69 46.
19.71 47.
19.73 48.
19.75 49.

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PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPILATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO 1	RATIOS APPLIED TO FLOWS 1.00
HYDROGRAPH AT	LAKE	4.55	1	3183.	
		(11.78)		(90.14)(	
ROUTED TO	DAM	4.55	1	2739.	
		(11.78)		(77.57)(	
ROUTED TO	1	4.55	1	2747.	
		(11.78)		(77.78)(	
ROUTED TO	2	4.55	1	2754.	
		(11.78)		(77.98)(	

1 SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	275.00	275.00	277.00
STORAGE	15.	15.	128.
OUTFLOW	0.	0.	189.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	277.95	.95	298.	2739.	5.00	21.00	18.75

PLAN 1 STATION 1

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
1.00	2747.	266.7	21.00

PLAN 1 STATION 2

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
1.00	2754.	265.8	21.00

1**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79
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APPENDIX 5

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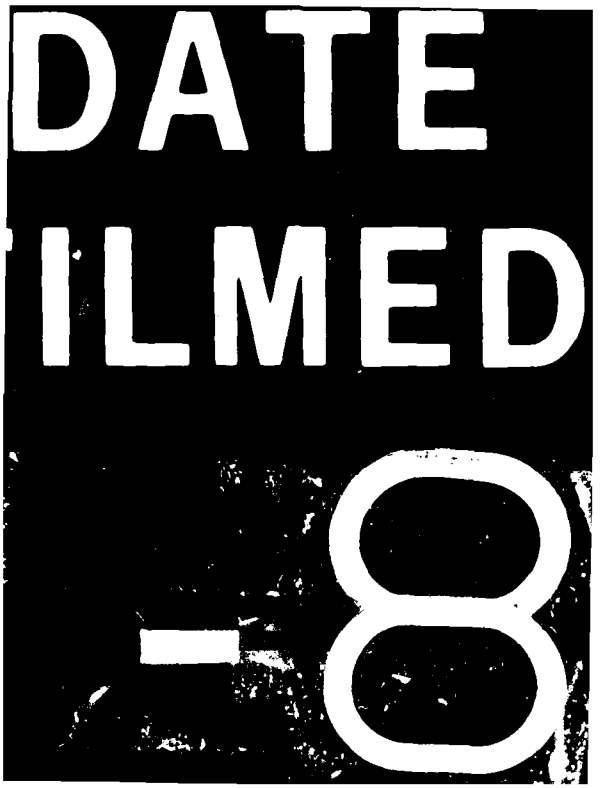
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